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| EXAMINER | | | | |
| NGUYEN, JOSEPH H | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary

Application No.

10/683,712

Applicant(s)

BOGNER ET AL.

Examiner

JOSEPH NGUYEN

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 May 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6-15, 25, 27, 28, 30, 31, 33-49, 52 and 54-64 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-15, 25, 27, 28, 30, 31, 33-35, 36-49, 52 and 54-64 is/are rejected.
- 7) ☒ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-848)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 5/28/08
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4, 6-7, 9-10, 13, 15, 17-22, 24-25, 27-28, 30-31, 33-35, 38-40, 43-46, 52 and 55-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arndt (U.S. Patent No. 6,376,902) in view of Kinsman (U.S. Patent No. 6,482,674).

Regarding claims 1, 13, 17, 30 and 52, Arndt discloses in figures 1A-1B a housing for one or more light emitting components comprising a lead-frame 7 including a mount part 2 having at least one wire connecting area 16; an opening (hole formed by the opposite side surfaces 18, 19) formed therein and extending completely through the mount part; and at least one external electrical connecting strip 4, 9; a housing base body 2, 18, 19 formed from a molding compound, wherein said lead frame 7 is embedded in said base body to pass out said connecting strip 4, 9 from said base body, and the housing is a surface mounted housing having a bearing surface. Arndt does not disclose a separately manufactured thermal connecting part disposed in said opening and fastened into said mount part to form an electrical connection with the at least one external electrical connecting strip, said thermal connecting part having at least one chip mounting area. However, Kinsman discloses in figures 1B-1C a separately

manufactured thermal connecting part 48 disposed in an opening and fastened into the mount part (where the chip 32 is mounted) by an adhesive 52 to form an electrical connection with at least one external electrical strip 38, said thermal connecting part having at least one chip mounting area so as to improve heat transfer from the chip 32 to the outside (column 4, lines 14-20). In view of such teaching, it would have been obvious at the time of the present invention to modify Arndt by including a separately manufactured thermal connecting part disposed in said opening and fastened into said mount part to form an electrical connection with the at least one external electrical connecting strip, said thermal connecting part having at least one chip mounting area so as to improve heat transfer from the chip to the outside.

Regarding claims 2-4, 6-7, 9-10, 15, 18-2, 24-25, 27-28, 31, 33-35, 38-40, 43-46 and 55-63, Arndt and Kinsman together discloses all the structures set forth in the claimed invention.

3. Claims 8, 23, 36, 37 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arndt and Kinsman.

Regarding claim 8, Arndt discloses in figures 1A-1B the reflector well 11 has a height greater than the chip 1 but not necessarily the reflector well having height no greater than twice a height of the chip. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Arndt and Kinsman by including the reflector well having height no greater than twice a height of the chip, since it has been held that discovering an optimum value of a result effective

variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 23, Arndt discloses in figures 1A-1B the reflector well 11 has a height greater than the chip 1 but not necessarily an overall height of said reflector being no greater than four times a height of the chip. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Arndt and Kinsman by including an overall height of said reflector being no greater than four times a height of the chip, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 36, 37 and 64, Arndt discloses in figures 1A-1B the semiconductor chip 1 and the radiation permeable compound 2, 18, 19 comprises a certain volume. Arndt nevertheless does not exclusively disclose the radiation permeable compound having a volume with the formula $V \leq qH$ where H is a height of the chip and q is a scaling factor having a value less than 10 mm^2 . It is noted that Arndt's chip 1 comprises a height as shown in figure 1B. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Arndt and Kinsman by including the radiation permeable compound having a volume with the formula $V \leq qH$ where H being a height of the chip and q being a scaling factor having a value less than 10 mm^2 , since it has been held that discovering an optimum

value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 37, similar to claim 37 above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Arndt and Kinsman by including q being a scaling factor having a value equal to 7 mm^2 , since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

4. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arndt and Kinsman in view of Parthasarathi (US Patent No. 5,650,663).

Regarding claim 12, Arndt and Kinsman disclose substantially all the structure set forth in claim 12 except for the lead-frame containing copper. However, Parthasarathi discloses in column 2, lines 18-22 the lead frame 16 contains copper to effectively form an electrical connection between the chip and the external circuit. In view of such teaching, it would have been obvious at the time of the present invention to modify Arndt and Kinsman by including the lead frame containing copper to effectively form an electrical connection between the chip and the external circuit.

5. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arndt and Kinsman in view of Han et al. (US Publication No. 2001/0054761).

Regarding claim 14, Arndt and Kinsman disclose substantially all the structure set forth in claim 14 except for the surface coating being a gold coating. However, Han

discloses in paragraph [0022], lines 4-5 the surface coating is a gold coating to form an better effective electrical external connection because gold is good electrical conductive, oxidation resistant. In view of such teaching, it would have been obvious at the time of the present invention to modify Arndt and Kinsman by including the surface coating being a gold coating to form a better effective electrical external connection.

6. Claims 41-42 and 47-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arndt and Kinsman in view of Matsumoto et al. (JP402187058).

Regarding claim 41, Arndt and Kinsman disclose substantially all the structure set forth in the claimed invention except for the chip being mounted on the chip mounting area by a silver solder. However, Matsumoto et al. discloses in figure 4 the chip 5 being mounted on the chip mounting area by a silver solder 6 (see Abstract). In view of such teaching, it would have been obvious at the time of the present invention to modify Arndt and Kinsman by having the chip being mounted on the chip mounting area by a silver solder to improve heat radiation (Abstract of Matsumoto).

Regarding claim 42, it is inherent the silver solder has a melting temperature greater than 260 C.

Regarding claims 47-48, similar to rejection of claims 41-42 above, the combination of Arndt and Matsumoto discloses all steps of the method set forth in claims 47-48.

7. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arndt and Kinsman in view of Mahulikar et al. (US Patent No. 5,608,267)

Regarding claim 49, Arndt and Kinsman disclose substantially all the structure set forth in claim 49 except for the mount part and the thermal connecting part compound being embedded by injection molding in the housing molding compound. However, Mahulikar et al. discloses in figure 2 the mount part (portion where device 12 is mounted on) and the thermal connecting part 26' is embedded in the housing molding compound 30 (column 6, lines 61-67). In view of such teaching, it would have been obvious at the time of the present invention to modify Arndt and Kinsman by embedding the mount part and the thermal connecting part in the housing molding compound to effectively package a semiconductor device because injection molding is known as an effective method to form a semiconductor device package.

8. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arndt and Kinsman in view of Huang (US 6664649).

Regarding claim 54, Arndt and Kinsman disclose substantially all the structure set forth in claim 17 except for an exterior surface to which the bearing surface mounting the housing. However, Huang discloses in figure 5 an exterior surface (printed circuit board) 560 to which the bearing surface (heat sink) 530 mounting the housing to further increase the heat dissipation efficiency (col. 5, lines 15-19). In view of such teaching, it would have been obvious at the time of the present invention to modify

Arndt and Kinsman by including an exterior surface to which the bearing surface mounting the housing to further increase the heat dissipation efficiency.

Response to Arguments

9. Applicant's arguments with respect to claims 1-4, 6-15, 17-25, 27-28, 30-31, 33-49, 52 and 54-64 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (571) 272-1734. The examiner can normally be reached on Monday-Friday, 8:30 am- 5:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300 for regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Kenneth A Parker/

Supervisory Patent Examiner, Art Unit 2815

/Joseph Nguyen/

Examiner, Art Unit 2815